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FRONT COVER. *The Rohtang Pass (13,000 ft.) in the Himalayas, showing the camp pitched by M. J. Hackney, author of the article "Himalayan Spring."*

OUR CONTRIBUTORS

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Polythene Film Prospects

By N. J. Travis (Managing Director, British Visqueen Ltd.)

In the United States sales of polythene film have rocketed to the point where the film is now cheaper than cellophane. In Britain the build-up of the polythene film market has been slower. The reasons for this and the big potentialities ahead of this remarkable packaging material are here reviewed.

Photograph by Ivor Ashmore

POLYTHENE film is just what its name implies. It is a transparent film of polythene—usually at the thinnest one-thousandth of an inch and at the thickest one-hundredth—produced by an ingenious extrusion process. The polythene chips are heated until they become a sort of liquid treacle, which is then blown up under air pressure into a giant bubble. The walls of the bubble are the polythene film.

As the bubble is drawn and elongated, so the walls harden until, in fact, they can be wound up on rollers in the form of a seamless flat tube. The width and thickness of the film depend on the size of the bubble and the amount of air pressure blown into it; and in theory (though not always so easily in practice) polythene film of any required manageable size can be made in this manner.

Although this particular process was developed in America during the war, the initial research work for it was done at Alkali Division. It is right that this work should not be forgotten. It was at Winnington in 1938 that polythene was first made and examined in film form; and there in 1940 that the first film ever to be made by the extrusion process materialised—a great advance on the hitherto accepted method of making film by casting from solution.

Alkali Division's pioneering work received spectacular development in the United States in the post-war years. The Visking Corporation were quick to grasp the potentialities of the new material. Here was a film virtually unaffected by climatic conditions; a transparent film that remains flexible under the widest extremes of temperature and does not shatter or tear easily, even after puncture; a film that is almost impervious to moisture.

The work of the Visking Corporation received its initial impetus from wartime orders. Polythene film was ordered in large quantities by the American Army as a covering for protecting rifles during waterborne landing operations by the Marine Corps, and proved eminently successful.

After the war, the production and sale of polythene film in the United States went ahead rapidly. Initially this was due to spectacular success in selling the product for household use—for tablecloths, for aprons, and for refrigerator bags. But by 1950 there was also a big ready-made demand from the packaging industry, who were alert to the advantages of the new material. They were quick to see that polythene film was pre-eminently suited to the requirements of the self-service store where the American housewife collects her requirements of fruit and vegetables already packed in transparent wrappings. The engineering industry did not hesitate to meet the problems of providing the special machinery that is alone capable of handling polythene film.

By 1950 these new machines were in widespread use. Sales of polythene film for the pre-packaging of fresh fruit and vegetables rocketed. Throughout America neat packages of apples, oranges, greens, potatoes or carrots—clean, fresh, and graded at the farm—appeared in polythene bags on the counters of department stores. Sales of polythene film rose from 3500 tons a year in 1949 to about 50,000 tons a year today. And with this increase in production came a fall in price. Today in the United States polythene film is cheaper than cellophane.

Britain has lagged somewhat behind in this spectacular development. In the first place, during the war our limited production of polythene was used almost entirely for the insulation of high-frequency cable. Little or no polythene was available for use as film. Almost the only exception to this was the small amount of film used for packing in a strip single doses of antimalarial drugs for the use of British troops on active service.

It was not until 1953 that the development of the polythene film market began in earnest in Britain. The problem of the selling of polythene film in Britain proved more varied and more difficult than in America. One reason for this has been that cellophane is relatively more expensive in the United States, so that polythene film has been more readily competitive over there.

Increasing Sales

Despite this drawback, the production of polythene film in this country has already reached the point where the price can be lowered because turnover is greater. As a result sales are increasing rapidly, and polythene film is now established in Britain as a cheap general-purpose packaging material with a big future ahead of it. And if, as is probable, the price of polythene falls still further in the next few years, the possibility of polythene film being used in preference to paper for certain purposes looms large, and the size of potential outlets in this field assumes a new order of magnitude.

Another interesting development in Britain has been the ready acceptance of a specially prepared polythene film treated so that it will take printing in colour. This enables manufacturers to brand their wares in a really attractive transparent covering—and moreover a covering which many people keep and use later for their own purposes. Polythene packaging thus offers a special bonus of lasting advertising value.

Advertising Value

Textiles, knitwear, hosiery, pillows and clothing goods generally are being increasingly packaged in polythene in Britain. Indeed, this form of packaging is becoming the counterpart of the packaging of fruit and vegetables in America. Today the Scottish knitwear trade, whose products are to be found in almost every country in the world, use almost exclusively polythene film for sound technical and commercial reasons.

In Britain, too, self-service and the pre-packing of fruit and vegetables are on the move. Opposition

exists, particularly from those who prefer the traditional methods of greengrocers' shops with variable prices, dirt-caked vegetables and the time-consuming queues waiting for produce to be weighed and packed. The cry goes up: "Who is to pay for pre-packing—grower, wholesaler, shopkeeper or housewife?"

Housewife's Choice

But the writing is on the wall. Once the housewife can buy washed and graded carrots sold under a branded name, these products can be marketed with price stability to the grower and with all the advantages that pertain to a tin of baked beans. Some enterprising growers and retailers are already willing to accept a little less profit to meet the new demand. The snowball has begun to roll—if only slowly.

I.C.I. Plastics Division initiated the manufacture and sale of polythene film in this country in the post-war years, but, foreseeing the extending market for polythene film in this country, I.C.I. and the Visking Corporation of Chicago decided early in 1953 to pool their resources in a joint company called British Visqueen Ltd., which was formed as a subsidiary company of I.C.I. in mid-1953. British Visqueen Ltd. began marketing the 'Visqueen' brand of polythene film early in 1954. Their first objective was to make a high-quality film suitable for automatic packaging machinery, together with a surface specially treated for printing—a quality labelled Visqueen C.

This policy has enabled those firms who are known in the packaging industry as converters to add polythene film to the ever-growing spectrum of packaging materials from which they design and fabricate packages. Today, supported by B.V.L., any progressive converter should be able to tailor packages to the functional requirements of the product being packed and the conditions under which it will be shipped and used.

Lack of Machinery

The main barrier between polythene film and many new markets is the absence of automatic machinery to handle it. Most machinery which handles paper, metal foil or cellulose films cannot be modified by simple means to handle polythene. For example, the abundance of machinery which exists for overwrapping packages such as cigarettes or textiles would need to be replaced before polythene could be introduced.

In Britain little work has been done on automatic machinery for polythene, and even in the United States, where packaging machinery firms have greater markets and incentives, the automatic overwrapping machine handling polythene is still in the development stage. One hundred bags per minute is a high rate of production for a bag machine using polythene (or any other transparent film); 4000 bags per minute is an accepted rate for paper. The challenge to packaging engineers is great, but unfortunately the engineering industry here seems to be too preoccupied doing what it knows how to do.

Wait and See

Unconvinced of the wisdom of taking chances on a developing market, the engineering trade appears to prefer to see these machines developed and built abroad, waiting to make licensing arrangements to manufacture here when the market is assured. This puts us behind, and a large proportion of B.V.L.'s sales effort is directed to breaking down and circumventing the shackles of slow development in the machinery field. By improving the manufacturing process and by increasing the volume of production, B.V.L. intend to market 'Visqueen' film at prices which will enable it to compete in new fields.

A second field of endeavour is to develop industrial applications outside the packaging industry. A successful start has already been made with a special form of film which is being manufactured for the horticultural trade for insulating glasshouses. It is sold under the name of 'Thermoplus.' This application has been widely acclaimed in both the technical and the national press. The *Manchester Guardian* correspondent, writing on 24th December 1955, introduced his assessment of 'Thermoplus' as follows:

> This year's most promising development in the glasshouse industry has been the use of clear plastic film as a lining material to conserve heat. For the commercial grower, whose winter fuel, however efficiently burned, costs more than his labour, it is a development of major economic importance. For the amateur, who must probably spend three times as much for every plant kept at a given temperature, its value is correspondingly higher. For many, indeed, it will make all the difference between making full use of the greenhouse and leaving it empty during the months when it could be of the greatest service.

Building Trade Prospects

Finally, one other new development must be mentioned. It is the introduction of 'Visqueen' film into the building industry as a relatively cheap moisture-proof covering. As the price today is almost competitive with building paper, the future here is promising.

EXTRUSION OF POLYTHENE FILM. *Polythene chips are heated until they become a sort of liquid treacle, which is then blown up under air pressure into a giant bubble. The walls of the bubble are the polythene film. The yellow film here being wound is a special variety manufactured to protect uncured rubber.*

Information Notes

LABELLED ATOMS

By John Lewis (Head Office)

References to isotopes have become very common since this country began to develop atomic energy piles. Here a member of Head Office Research Department explains what they are and how they can be used as an important tool of research.

WHEN a bank is robbed, the police at once notify other banks, post offices and shops all over the country of the numbers of the notes that have been stolen. Notes all look exactly alike to the casual observer, but as soon as someone appears with a note bearing one of the crucial numbers, a line has been found which may lead to the thieves. Now the research chemist is often confronted with a similar problem. He wants to keep track of some chemical through a whole collection of processes in which it mingles with other chemicals and other quantities of the same chemical, just as the stolen banknotes do when the thieves have got them into circulation.

For example, he may be studying the action of a drug which gets chemically transformed inside the body: chemical examination of body tissues after the drug has been administered may reveal a number of chemicals all over the body which *might* have been made from the drug by the body's processes. How can he tell which of them *has* come from it? The drug and the chemicals made from it are composed of the same chemical elements, and to the chemical analyst all atoms of the same element are exactly alike.

What the chemist needs is a sort of label, like the number on a banknote, which he can tie on to the drug so that any substance made from the drug inside the body still carries the tell-tale mark. That is why isotopes are so useful to him, because they are, in effect, labelled atoms.

How is this possible? You cannot literally tie a label or stamp a number on an atom, since it is far too small. Or, to put the same difficulty in another way, you cannot mark a chemical substance (e.g. by painting the atoms pink, as a classmate of mine once suggested when I was at school) without turning it into some other substance, which will probably ruin the whole experiment. Before scientists knew as much as they now do about the inside structure of chemical atoms, when they thought they were just hard solid balls of "stuff," there would have seemed to be no answer to this problem.

But we now know that the atom is really a very complex structure indeed, something like a tiny model of the sun with the planets going round it. What makes up the weight of the atom is its central core, or nucleus, which is a conglomeration of heavy electrical particles called protons and neutrons; but what determines its chemical properties is the very light electrical particles called electrons, which may be thought of as floating round the core like planets round the sun.

There must be a balance in electric charge between the electrons and the protons, but what we now know is that the number of neutrons in the central core can vary even though the protons and electrons remain the same. And so it *is* possible to label an atom, by adding on some neutrons to its nucleus, although it remains the same chemical substance because the number of outer electrons is not altered.

This would be a very useful thing in itself, but often there is an unexpected dividend. The addition of the extra neutrons can so upset the balance of the electric forces which keep the atoms together that it becomes radioactive—it starts to send out rays of various sorts.

We then have an atom which is like the crocodile in *Peter Pan* that had swallowed an alarm clock. It gives away its presence by its radiations wherever it happens to be, in whatever chemical combinations it is involved. The phenomenon of radioactivity has been known for a long time, because there are some substances which are naturally radioactive, notably radium. Now that we have atomic piles, however, with lots of neutrons buzzing about at high speeds inside, or atom-smashing machines like the cyclotron, we can make practically any element radioactive by producing a suitable disturbance of its nucleus.

Atoms of the same chemical substance which weigh different amounts through having different numbers of neutrons in the nucleus are called the different isotopes of the substance. There can be several different isotopes of the same substance, depending on how many extra neutrons each atom of it has acquired, and some of these may be radioactive, others non-radioactive, or stable. Both can be used in chemical research, the choice depending on the problem in hand.

. . . these stable labels

What the chemist does is to make up a quantity of the chemical compound he wants to study, using one component that has some labelled atoms in it. He can then detect what has happened to that particular specimen of the compound even after it has been mixed—in a chemical plant, for instance—with other quantities of the same substance. By this sort of method it is possible to detect, for example, from which of a number of different nitrogen-containing foodstuffs particular organs of the body draw their nitrogen.

Special apparatus is required to do the detecting, of course. You cannot tell a labelled atom by looking at it, as you can a labelled banknote. Radioactive isotopes give themselves away provided you have some instrument for detecting the radiations, and in some experiments where you are dealing with suitable quantities you can actually do this with an ordinary photographic plate.

A leaf which has absorbed some radioactive substance —from a labelled fertilizer in the soil, for instance—will give off radiations which enable you to see how the labelled substance is distributed in the leaf tissue simply by pressing it against a photographic plate, when a complete auto-radiograph is obtained. It is not usually as easy as that, however, and in any case a radiograph does not tell you very accurately how much of the radioactive substance has gone into different places. That is why the usual tool for detecting radioactive isotopes is the geiger counter, which actually measures the strength of radiations and can detect incredibly small quantities of them.

Stable isotopes present a more difficult problem, but quite often they have to be used—because the radiations from a radioactive isotope of the same element would constitute a danger to health, for instance, or alternatively because that particular element has no radioactive isotope which will go on radiating for long enough. (Different radioactive substances remain active for very different times: there is one isotope of carbon which will be "dead" after a few hours, another which will go on radiating for thousands of years.)

Nitrogen, a most important element which chemists often want to label, has no radioactive isotope that stays "alive" for more than half an hour, but it has a stable isotope. The problem of detecting these stable labels, which are simply a matter of extra weight at the atom's centre, with no radiation, is solved by means of an instrument known as a mass spectrometer.

. . . often confronted

I.C.I. research workers are making a good deal of use of labelled atoms. Three Divisions have mass spectrometers, and nine are using radioactive isotopes.

After the war, when it was obvious just how important this new research tool was likely to be, Sir Wallace Akers set up a special I.C.I. committee with representatives from most Divisions to explore for the whole Company methods of using isotopes, ways of overcoming the dangers presented by radiations from radioactive isotopes, the merits of the different brands of detection apparatus on the market, and similar problems. This committee called itself the Labelled Atoms Panel, and it still exists, doing valuable co-ordinating work, even though its pioneering days are over.

TV AS A TOOL OF INDUSTRY

By W. Nock (Nobel Division)

Closed-circuit television—that is to say, television relayed by line instead of being broadcast—is today an important tool of industry. Without television, for instance, atomic energy would be even more difficult to harness, since the television camera serves to replace the human eye under conditions where a few minutes' exposure might mean death. Here is a survey of the many uses to which closed-circuit television is now being put.

REMOTE viewing by closed-circuit TV is a fascinating post-war development in industry. The fields in which it can be profitably used are, of course, still small and rather specialised, but they are none the less interesting for that.

Foremost among the specialised applications is perhaps the use of closed-circuit TV for remote viewing and control in the harnessing of atomic energy. By means of the TV camera observation becomes possible in places where a few minutes' exposure might mean death.

Therefore this work must be done from behind thick concrete walls with remotely controlled machinery replacing the operator's hands and TV replacing his eyes. By these means radioactive materials can be taken out of their containers and the whole complicated business of chemical separation carried out without anybody present.

Research on rocket motors and guided missiles too depends a great deal on closed-circuit TV. Such are the hazards if anything should go wrong that it is necessary to control many phases of rocket research from behind a concrete shelter. TV has the further advantage that it permits a close-up view of important parts during firing. It also enables the person controlling the firing to make sure that everybody is clear of the firing site.

It is in this field of difficult experiments that we in Nobel Division are interested in closed-circuit TV. We too prefer to be behind a substantial wall if we think that there may be an explosion. Observation slits and armoured glass are, of course, also used, but TV has the advantage of producing close-up pictures at any angle. It may also be useful for adjusting explosives manufacturing machinery and supervising the automatic factories of the future.

Less dramatic uses of TV are found in commerce where the need is for the rapid transmission of information. For instance, TV is used by banks to check signatures. The time-saving is considerable. Another example of time-saving is the use of TV by one particular company to provide instant communication between its design offices and the model shop half a mile away. A two-way system is employed, and discussions concerning drawings or models can take place without time being wasted in walking.

TV is also used to control transport. An excellent example is the speeding up of work in large railway marshalling yards. Normally an incoming goods train is put into a siding and the destination of each truck is noted. The train can then be broken up and the trucks shunted to their allocated sidings.

Using TV the procedure is as follows. The train is brought into the marshalling yard along one particular track, a TV camera being arranged to view the trucks as they pass, and in the control room their destinations are noted. By the time the train has reached the point where it is to be split up, a shunting engine and shunters have been called up by radio and instructions issued for the allocation of the trucks to their correct sidings. The trucks are therefore saved perhaps several days' wait in the siding. This system is being operated in certain marshalling yards in the United States.

Ships, too, have found TV useful. On a ship the view from the bridge is only good in the forward direction; astern one has to rely on look-out men. TV can be used to provide a "driving mirror" when docking. On the whaling factory ship *Balaena* docking presents particular difficulty, since the bridge is 500 ft. from the stern. TV solves this problem, and also makes it easier for the factory ship to handle at sea the whale carcasses and the small whaling ships which tie up to its stern.

In the aircraft industry TV has found many uses, particularly on flying test beds. Observations can be made on engines and remote gauges and transmitted to one point in the aircraft.

The military use of TV is also not being neglected, either here or abroad. Recently an army exercise in the United States was covered by TV. Signal units set up TV cameras on vantage points, and one was also installed in a helicopter. These cameras sent their pictures back to headquarters, where the officer in charge could study the situation at first hand.

Incidentally, one of the first permanent closed-circuit TV systems in the world was installed at Guy's Hospital in 1949; it was unique in its application of TV to surgery. A special TV camera was built on to the trolley which carries the shadowless lamp used in an operating theatre. The camera was remotely controlled, and the picture shown to viewers could be a close-up, life-size or general view. The surgeon explained through a microphone what he was doing.

For years students had craned forward in the gallery trying to follow through the glass windows the course of an operation below. Now they could see everything, as though each was able to look over the surgeon's shoulder.

In the United States one of the earliest closed-circuit TV installations was the remote observation of some boiler water level gauges at the Hell Gate Power Station in New York. The gauges were particularly inaccessible and at a considerable distance from the central control panel of the power station. It was essential that these gauges should be closely watched by the engineer in charge.

At first sight you might think that a TV system is an expensive way to watch boiler gauges and that some simpler method of transmitting the readings must exist. However, the important thing about watching gauges by TV is that the camera cannot lie. If the TV system is not working properly the gauges may be difficult to see, but nothing can occur to give false information.

The big manufacturers of TV equipment in this country and the United States are putting a lot of effort into producing equipment specially designed for closed-circuit work. Design is not easy, because cheapness is one of the main requirements. Although the equipment need not conform to such a high standard of picture quality as a studio circuit, for industrial use an entirely new conception of reliability is needed. In a TV studio there are engineers to twiddle the knobs to get a perfect picture, but in an industrial plant the operatives expect to switch on and get a satisfactory picture without further ado.

(*Photo by permission of E.M.I.*)

The operating theatre at Guy's Hospital, showing the television camera fitted to the shadowless lamp

This perfection has not yet been reached, but the equipment available is improving continually.

Let us look at a typical example of these industrial TV equipments. It is usually made up of three parts: a small camera, a control unit, and the viewing units. The camera can be remotely controlled, and can be fitted with a range of attachments which allow the lens to be changed or the camera to be swung from side to side or tilted up and down, all remotely.

Viewing units are available giving a wide range in the size of picture, from about postcard size up to those normally used for domestic receivers. Despite cheaper and inferior apparatus, the overall picture quality is usually better than that normally obtained on domestic TV. This is because quality does not suffer so much in transmission to the viewer.

Now for the cost. Good equipment can be obtained for £1000, but with camera tubes at about £100 for 500–1000 hours' life the running costs are high. Still, this compares well with studio TV equipment, for which you would pay £5000 to £10,000, with camera tubes costing about £300 for a life of about 300 hours.

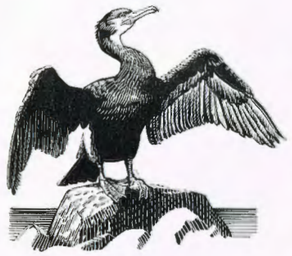
What of the future? I think that the use of industrial TV will increase as reliability improves, but it will have a hard struggle against prejudice and high running costs.

BIRDS OF THE TEES ESTUARY

By Charles W. Armstrong (Billingham Division)

Illustrated by Raymond Sheppard, R.I.

Wildfowl and the production of chemicals seem strange bedfellows. Yet it is a fact that within sight of the vast Billingham Works the lonely cries of the wild life of an estuary are still to be heard.



Cormorant

To see the birds on the Tees Estuary at their best it is advisable to watch when the tide is just turning and beginning to creep over the mud. Curlew, redshank and whimbrel flight before the tide, and wispy clouds of knot and dunlin wheel and twist in amazing uniformity. Later will fly the handsome black and white oystercatchers and numerous species of tern and gull.

Out in the tideways you can discern mallard, widgeon and teal, and in winter time more rare species of duck and occasional black straggling lines of brent geese. Great black and ugly cormorants flight and fish about the estuary, and a cold spell will see the northern divers and mergansers away out in the open water.

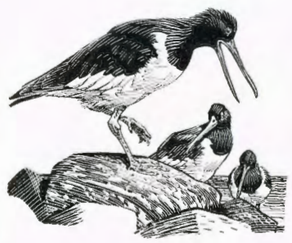
Dunlin

Given good conditions, an expert can recognise something like a hundred different species of birds on the Tees Estuary.

Curlew

Listening to fowl is a more fascinating pastime than actually watching them. One night, or rather early morning, in the late summer I was on a fowling trip and passed the waiting hour or so until dawn listening to the estuarine music beyond the sea wall.

Oystercatchers piped incessantly, and with them came the long, quavering whistle of whimbrel and piercing *tuek-tuek* of redshank. The melancholy cry of the curlew was symbolic of moor and estuary and all wild places; and harsh and frightening came the gabble of the fussy shelduck, a sound so peculiar that it has given rise to a legend in some fishing communities that it is the anguished cries of lost fishermen.

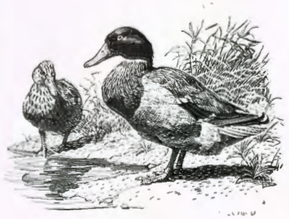


Oystercatcher

Herring gull

Migrating widgeon whistled their peculiar soft whistle, which is heard into the Arctic Circle and beyond the Urals on almost every estuary of the Old World. More domestic-sounding was the low quack of preening mallards, and the sounds were completed by the shrill pipings and trillings of the smaller waders.

It was strange to sit in the darkness and reflect that as we were listening to these sounds we were never out of sight of some factory chimney.



Mallard

A NEW COAL BLASTING TECHNIQUE

By Robert Haslam (Nobel Division)

A new technique for winning coal—called pulsed infusion shotfiring—has recently been developed by Nobel Division. In it water is used to spread the force of the explosion more effectively in the coal seam. And at the same time the water serves both to lay the dust of shotfiring and to eliminate risk of firedamp explosion.

WATER has long been regarded by coal miners as one of their natural enemies. In the past a sudden inrush of water into mine workings has been responsible for a number of big disasters. Today water is being increasingly harnessed as the ally of the miner. It is used to suppress dust in the fight against the lung disease pneumoconiosis. It is used, too, hydraulically to propel coal from the workings to the surface, thus eliminating the complexities of haulage and winding of coal by conventional methods.

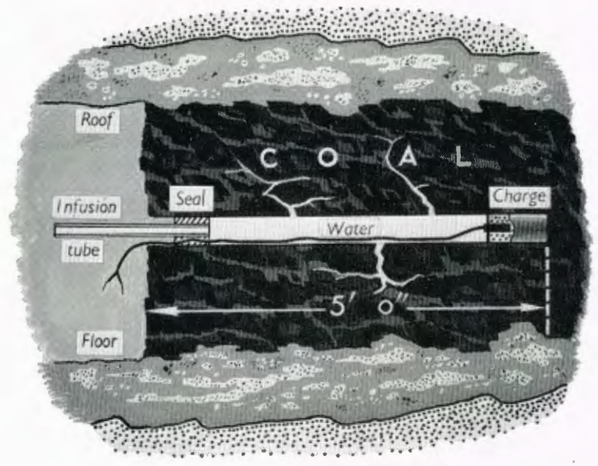
Recently a new use for water in the mines has been developed. This is to combine water and explosives together in the winning of coal, and so to lay the dust and fumes of shotfiring and to eliminate any possibility of a firedamp explosion. It was in August 1952 that the Safety in Mines Research Establishment suggested a discussion with Nobel Division on this matter. Since then Nobel Division has been responsible for the development of this new technique, referred to as Pulsed Infusion Shotfiring.

The technique of pulsed infusion shotfiring is as follows. First a hole is bored into the coal and an explosive charge inserted. Then an infusion tube is pushed into the collar of the hole. This device consists essentially of a tube and a gland. It performs a dual function: it introduces a supply of high-pressure water into the hole and also acts as a sealing plug. Pressures of up to 1000 lb./sq. in. are employed, but more typical figures range from 300 to 400 lb./sq. in. The water then penetrates into the surrounding coal, filling up any slips or breaks.

Under this pressure a shot is fired with a submarine detonator, and the impulse of the explosion is transmitted throughout the water mass, thus breaking down the coal. It is found that with this technique the explosive energy available is used far more efficiently than when blasting in the conventional manner "in the dry," and in addition the quality of coal breakage is better.

A special "permitted" explosive had to be developed to meet the demands of this technique and has been named 'Hydrobel.' Its composition is such that it will work reliably under the high hydrostatic pressures involved. For example, tests have shown that it will fire effectively after being subjected to a pressure of 1000 lb./sq. in. for 24 hours. Previously the best waterproof permitted explosive available would withstand a pressure of only about 20 lb./sq. in.

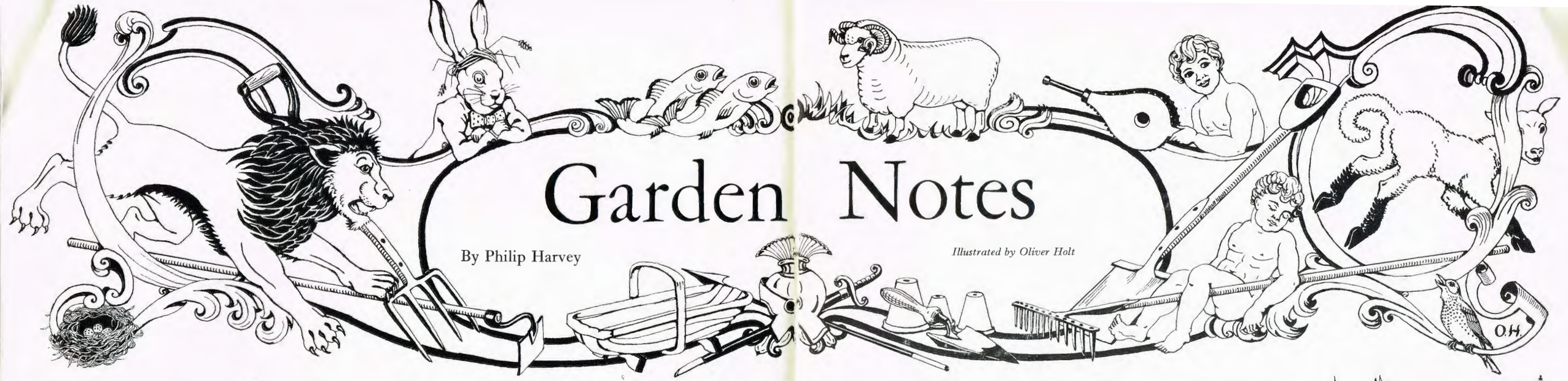
This new method of blasting is now in regular use at about fifteen collieries, and at the time of writing some 70,000 shots have been fired in this manner. National



Coal Board officials and inspectors of mines have expressed enthusiasm for the new technique, which is generally felt to have considerable potentialities.

Pulsed infusion shotfiring has one further advantage. It tends to "pre-soften" the coal, and this may make it possible to extend to the harder seams the use of cutter loaders. These machines both win and load by mechanical means and have hitherto been found to be effective only with soft, friable coal.

Interest in pulsed infusion shotfiring is now being shown in a number of other countries. Mining engineers from France, Holland, Australia, India, U.S.A. and Canada have already visited this country to see for themselves the new technique in operation.



Garden Notes

By Philip Harvey

Illustrated by Oliver Holt

ALTHOUGH potatoes are often said to prefer light rather than heavy land (provided it has been well manured), they are less successful in a dry summer. Last year many maincrop varieties gave yields notable for quantity as opposed to size. Insufficient moisture during the growing season was the obvious explanation, and on dry soils every effort must be made to prevent this. Work in plenty of compost, hop manure, peat and similar humus-forming materials.

Potatoes dislike sticky clay soils. The soil in one part of my garden is like this, and unless it is lightened by incorporating peat, road grit, coarse sand, etc., the crop is mediocre. Farmyard manure also opens up sticky clays and is an excellent means of adding bulk to any soil; on heavy land horse manure is probably best, while on lighter soils cow manure is preferable.

First early varieties should be planted this month, assuming the ground is reasonably dry. There is always a risk of late frosts; but if time permits, heap straw or bracken over the tops on cold evenings when frost threatens.

Never lime land intended for potatoes, as this often leads to scab.

Catalogues offer a fairly wide choice of varieties, but it is always advisable to ascertain those which do well in your district, as some kinds will tolerate very dry soils; for example, *Arran Pilot* in the earlies and *Arran Banner* in the mid-season varieties and *Majestic* in the maincrops. *Sharpe's Express* gives a good crop on really heavy land.

Some gardeners consider it a waste of time to grow maincrops, as potatoes can then be bought very cheaply. This always seems to me a very utilitarian point of view, as there is no variety in the earlies to compare with the maincrop *Golden Wonder*.

With its wonderful keeping quality *Golden Wonder* is excellent eating after Christmas. It is an irregular cropper and gives best results on light, sandy land with plenty of body. On heavy ground the floury, chestnut flavour is less noticeable. At one time large acreages of *Golden Wonder* were grown in Scotland for fish and chip merchants. Compared with most other potatoes, this variety absorbs relatively little fat.

Textbooks are always proclaiming the virtues of a fine tilth on seed-beds. This is, I am afraid, difficult to achieve on cold, wet soils where slow, irregular germination and damping off are always potential enemies. Seed decay and pre-emergence damping off often cause considerable losses among peas and beans. If these early losses could be prevented, heavier and better-quality crops would be obtained.

The answer has now been found in the organic sulphur compound known as thiram; this is the basis of a new seed dressing from Plant Protection Ltd. named 'Seed-Saver.' When sowing broad beans, runner beans, Brussels sprouts, onions, peas or lettuce, puff a little of this direct into the packet of seed and you will be certain of an even row of seedlings.

Is March the ideal month for rose pruning? In recent years some gardeners who have gone over to winter pruning have tended to be dogmatic on this subject. There is no cut and dried answer. In a mild winter you can, so to speak, get away with it; but if really cold, frosty weather comes soon after January pruning, any eyes which have started to shoot will be checked, and there is accordingly no real advantage over the traditional March cutting back. It is a great mistake to lay down the law about timing merely on the strength of a year or two's experience.

Should one prune hard, medium or light? In the past, rose enthusiasts tended to make a tremendous ritual of pruning, specifying individual treatment for different varieties, with rigid distinctions between trees grown for exhibition and garden decoration. Instructions were given to prune to six eyes for one variety, to five for another and so on, which inevitably confused the beginner.

The present-day approach is more sensible, although there are still differences of opinion. It is, I think, generally agreed that very hard pruning is a mistake. This treatment does not produce stronger growth or more blooms, nor are the resulting blooms of higher quality than those from trees which have received only moderate cutting back. On dry, thin soils hard pruning may debilitate the tree and, if it is very weak, even kill it outright.

Newly planted bush roses, including standards, are, however, usually pruned hard to about four eyes from the base, as the trees cannot be expected to support a heavy weight of top growth before they have established a sound root system. I must admit that I sometimes break this rule with no subsequent ill effects. For example, with extravigorous hybrid teas like *Peace*, *Fred Howard*, *Margaret* and *Royalist* it is generally safe to prune only moderately.

For established bush roses the best practice is to remove any weak, unripe, diseased or dead wood, leaving only the well-ripened lateral growths of the previous summer. These side shoots are then pruned to three or four eyes, and the job is finished. Always take care to cut out weak, twiggy growths round the centre of the tree, as black spot often starts on this type of wood.

If you contemplate planting any pinks or carnations, remember to raise the bed slightly on heavy ground, as perfect drainage is essential for first-class results. Firm and not deep planting is imperative. Among the *Allwoodii* pinks the orange-scarlet *Robin* and bright crimson *Winston* are especially fine.

Himalayan Spring

By Meynell Hackney (formerly of I.C.I. (India))

Two years ago the author and his wife were camping at 7000 ft. in the foothills of the Himalayas. As the snows began to melt, a profusion of wild flowers was revealed, garlanding the slopes with a riot of beauty like an English garden at its prime.

Photographs by the author

New Year's Eve, 1953, found my wife and myself at 6000 ft., in a grossly overladen car, struggling through the first drifting snows of winter near the head of the Kulu Valley in the west central Himalaya. Our immediate goal, apart from the snowdrift in which we shortly became embedded and from which we were dragged that night with ropes, was a small cottage in the deodar forest three miles ahead, with a whole year of time to squander in the hills.

During January and February we were tucked into our cottage by several feet of snow—dry powder snow which would fall heavily for two or three days and be followed by brilliant spells of fine weather fit for sunbathing.

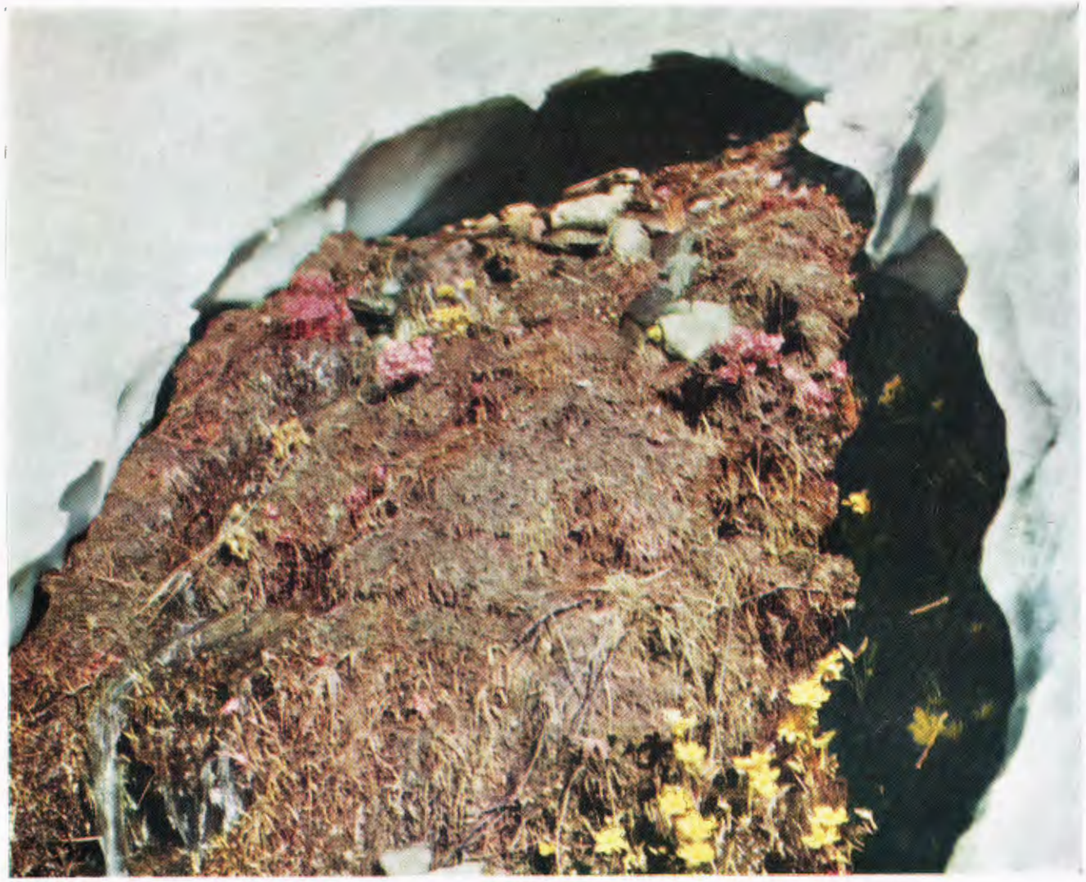
Panther, driven down by the hard weather, raided the farmsteads by night and encircled our home in the hope of carrying off our two dogs. The homely task of giving the dogs a little run before retiring to bed at night had to be done in the full glare of a pressure lantern under wary supervision and in temperatures down to 20 degrees of frost. The bears, sustained by their thick yellow autumn fat, were asleep in their secret hidey-holes. We seldom saw other dwellers in the forest but, padding around in our snowshoes, had endless fun guessing the authors of many intriguing tracks: fox, jackal, marten, porcupine, jungle cat, pheasant, and a host of small mammals and birds.

In March the snow at our level began to melt. The shrub Daphne, or Snow Flower, bore the first pink blossom of very early spring. Soon droves of naturalised daffodils appeared in our garden and orchard, a legacy from a fellow countryman and his wife who had lived here until the throes of "partition" drove them from their home seven years previously. Then apricot and prunus, cherry and peach, the wild tulip (*Tulipa stellata*) thrust its pale lamps through the short spring grass and the call of the cuckoo floated through the quickening woods. When they hear the first cuckoo, the people of Kulu run to the larder and eat something sweet for good luck.

We spread our tentage to air in the warm sun and repacked our camping kit into 60 lb. loads, one for a porter or two for a pack animal. Apart from the main business of trekking and exploring we had planned to do many things during the coming months: to fish for trout, to extend a collection of local butterflies, to watch birds, and later to shoot pheasant, chukor, partridge and woodcock.

In the event, however, we spent most of the year chasing after wildflowers and photographing them in colour. It started in a small way—experimental shots of daffodils and fruit blossom, then a wild tulip and some rock violets. The first results were so encouraging and the growing vista of new subjects so enchanting that we never looked back.

As the snowline withdrew hourly towards the higher



SPRING FLOWERS *bursting through the Himalayan snow. As the snow melts, flowers such as primula and the kingcup burst into blossom.*

alps, a carpet of gay spring flowers crowded on its melting heels. Azure blue gentians, the night-blue dwarf iris, the many-hued potentilla, and the anemone in white, blue and yellow—the last always at 12,000 ft. and above, an infallible natural altimeter. In the vanguard of this tide and often flowering through the snow itself were primulas of many species; lilac, coral pink, white and royal purple.

Interwoven with these flowers on all sides was a burnished golden matrix of kingcups, filling each downward runnel of snow-melt—an adventure in general colour design which only Nature dare attempt. The beauty of the flowers was all the more striking because they burst forth into the sunlight through the brown mat of last autumn's herbage, crushed flat by the weight of winter's snow. This was the heyday of dwarf plants, which must flourish and complete their cycle before being stifled by the rank grasses of the summer rains.

On previous trips to these mountains—brief spells away from the office desk or from war service—we had always been consumed by the urge to see as great an expanse of new country as possible in the few days' freedom given to us. This entailed marching almost daily—sometimes 20 to 30 miles between camps—and confined us to the larger tracks fit for animal transport. In those days we found little or no opportunity to explore the inviting small paths which disappeared temptingly into the side valleys and through those to the watershed alps beyond. Now things were

TROLLIUS ACAULIS—*a high Alpine plant about 6 in. high. This beautiful perennial grows rather sparsely on high ridges above the Kulu Valley.*

different; we had time to explore.

We therefore put out a series of high-alp camps at tree-line, radiating from our cottage base at the head of the valley. These camps were approached by small tracks which only porters and my wife's sure-footed riding pony could tackle; they involved one or two long marches each way. After pitching camp the porters were paid off and told to come back for us in three to ten days as the case might be. They were all busy with their crops in the valley anyway, and could only be hired for short spells.

Life in those camps was very rewarding. They were sited with the greatest care to provide a superb view coupled with shelter and comfortable proximity to wood and water. We burnt as much wood at our camp fire each night as a household in this country would consume in a full winter month; our men hauled it in daily while we explored the mountains around camp. Comfortably tired out, an enamelled mug of hot rum toddy at the elbow and one's feet pretty well in the flames, those nights at the tent mouth under a blaze of frosty stars were quite something to remember.

A BEAUTIFUL YELLOW WILD *rose from the Tibetan border country*

IMPATIENS GIGANTEUM—*a giant pink and white balsam growing to 8 ft.*

A SPECIES OF ASTER *which riots happily among the mountain rocks*

MECONOPSIS ACULEATA—*a Himalayan blue poppy, sometimes grown in English gardens*

And the days no less: none of the exacting chores of a big mountain expedition with a dutiful purpose before it; no imperative upward routes to reconnoitre; no "build-ups" in support of attacking summit parties. Just to follow your fancy, explore the edges of the unfolding snow carpet above camp, poke your nose round that unturned corner you left yesterday. Live quietly in the mountain forest and look about you—its beauty and interest, from the widest horizon to the smallest underfoot detail, an endless satisfaction.

Five such camps we pitched and struck before the end of June. By then the monsoon clouds were blowing up from the south and west: they would bring 50–60 inches of rain to the valley in the next three months. Time to follow the choughs and the Dogra shepherds northwards over the Rohtang Pass into the dry mountains of Lahul, which know no rain but only winter snow.

The Black-headed Gull

By Gordon Wood (Billingham Division)

Few people seem to be aware that the black-headed gull, so common on our coasts, leaves the seashore in spring to breed inland on moorland marshes. These gulls, with their black heads more darkly dominant in the breeding season, are birds of great beauty.

Photographs by the author

THE black-headed gull is an interesting bird because it is the only gull (except for occasionally the common tern) which goes inland to breed.

A black-headed gull alights on the nest. Wing span is usually about 30 in.

At the end of this month flocks of these handsome birds will be leaving our coasts for marshy areas where they will get down to the serious business of laying eggs and rearing families in nests built on the ground among clumps of willow, ling and grass.

I have watched and photographed one of these colonies for several seasons on a marsh on the North Yorkshire moors, close to my home at Loftus, near Saltburn. You cannot very well plant a "hide" in the middle of a marsh, and so the only way of photographing the birds is by remote control. I build my hide on the edge of the moor bordering the marsh with the nearest nest about thirty yards away. Near the nest itself I set up a tripod bearing a dummy camera.

By the end of a week the birds have become accustomed to the hide and to the tripod, and I can replace the dummy camera with a real one enclosed in a waterproof case. The shutter release leads are connected and the plastic-covered flex paid out back to the hide, where I have my

A black-headed gull on the nest. If undisturbed, these gulls return to the same nesting place year after year. With one rare exception, they are the only gull which deserts the coast in the breeding season.

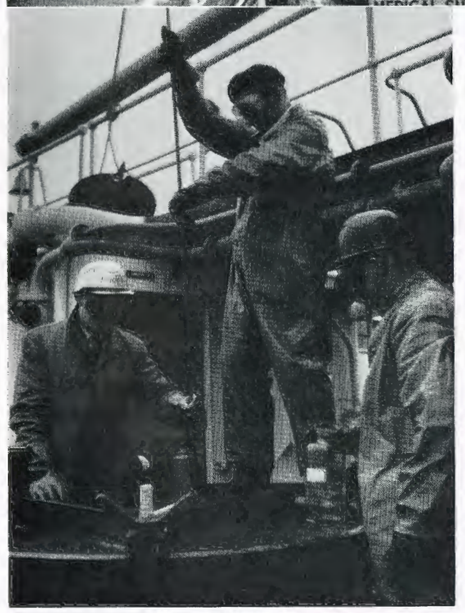
battery-operated remote control. (This unit was designed, incidentally, by the well-known naturalist Mr. W. Mortimer Batten.)

From then on it is only a matter of patience. Sometimes my sessions in the hide have lasted as long as 5½ hours, waiting for just the right shot. But there is always plenty to watch and listen to. The gulls whirl in the distance, performing all kinds of aerobatics and looking like a miniature snowstorm. After much dispute among themselves they finally settle on the nests. Then other sounds begin to intrude: the bleat of moor sheep; the lazy droning of a bee; the thrilling call of a curlew.

At the end of August the colony leaves the marsh for the seashore cliffs with their young, which, in their brown and white livery, little resemble their elders. The adult birds, incidentally, only bear their black hoods in the breeding season. During the autumn the black hood disappears, not to reappear until the following February.

For the technically minded, my remote control consists of a solenoid arrangement fixed to the panel of the camera and connected by plastic-covered flex to a wooden spool containing a switch, which is operated by three flashlight batteries giving a total of 13·5 volts.

NEWS IN PICTURES



Bulk shipment *of caustic liquor to Jamaica by Alkali Division in co-operation with United Molasses Co. Above: Handling operations on the tanker "Athelstane." Left: A ship's officer draws off a sample after loading. Technical Service personnel stand by.* (*Story on page* 89.)

Chief Okorodudu (*Commissioner for the Western Region of Nigeria*) *is seen chatting with Mr. A. R. N. Roberts* (*Head Office*) *at reception for Nigerian trade commissioners in Britain held in Imperial Chemical House*

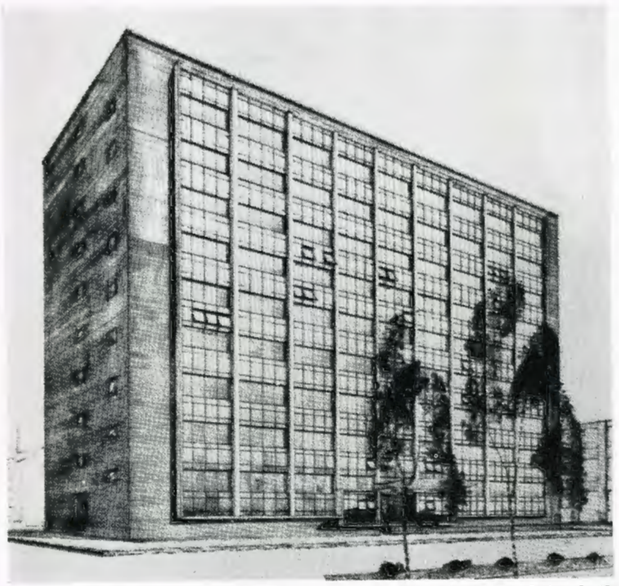
Minister *of Agriculture and Fisheries, Mr. Heathcoat Amory* (*second from right*), *toured Billingham during a recent visit to Tees-side. With him are Mr. W. D. Scott* (*Main Board*), *Mr. Alec Spearman, M.P., Mr. W. K. Hall* (*Works General Manager*), *and Mr. W. J. V. Ward* (*Division chairman*)

Boom *in 'Alkathene' toys. Above: A fourteen stone father shows the reason why—the toys do not crack, break or splinter even when trodden on*

The world's largest *'Perspex' statue, commissioned for Pacific Steam Navigation liner "Reina del Mar," carved by Australian sculptor Dr. Arthur Fleischmann from half-ton block*

Suez Contractors. *I.C.I. seconded staff at hand-over of Abu Sultan Depot: Mr. G. H. Kirby* (*extreme left, seated row*), *Mr. C. E. Dardier* (*fifth from left*), *Mr. E. Owen* (*second from right*), *and Mr. D. R. Lyon* (*sixth from left, standing row*)

Ammonia from Billingham *is being used to build a system of giant ice walls underground to keep water out of the pit shaft workings for the new colliery at Cotgrave near Nottingham. The first coal from the mine should reach the surface in about seven years' time. Above: The scene today. On the left are two drilling rigs for sinking boreholes to take freezing tubes*



An artist's impression *of the ten-storey office block now being built at Metals Division headquarters, Witton. The architecture of this new building conforms with the new "growing upward" trend in Birmingham*

First performance *outside France of the recently discovered opera "Ivan IV" by Bizet was given by the Liverpool Grand Opera Company. Our picture shows Mr. Gordon Miller (General Chemicals Division) singing one of the main tenor roles*

A party *of public relations officers mainly from German chemical firms visited Head Office recently to see I.C.I.'s publicity organisation. Above, left: Frau Dr. Friedrich (Dynamit A.G.) with Miss B. Webster (Central Labour). Right: Mr. A. Q. Tollit (Central Publicity) on the left and Herr E. B. von Wehrenalp, editor of "Chemische Industrie"*

Rugby. *Mr. J. S. Ritchie (Paints Division Engineering Dept.) captained Irish XV in recent internationals against France and England*

I.C.I.A.N.Z. technical service team *solved the problem of a reservoir at Charlton (Victoria) which would not hold water by lining it with 'Visqueen.' Today* 4,500,000 *gallons of water rests tranquilly on its 'Visqueen' bed*

Polythene granules *for British Visqueen Ltd. at Stevenage are now being shipped out of Wilton in Wilton's first bulk carrier*

Women staff *at Alkali Division's Wallerscote Works asked to see the plant and processes they hear about in their day-to-day duties. Above: The first party sets out*

I.C.I. NEWS

I.C.I. CATERING CONFERENCE

Over ninety representatives from the catering staffs of offices and works throughout the Company attended the I.C.I. Catering Conference held in London at the end of January.

The main purpose of this year's conference was to give emphasis to the Company's emergency feeding programme. General Sir William Morgan, I.C.I.'s adviser on Civil Defence matters, spoke to the delegates and emphasised the vital part played by the programme in the Company's Civil Defence service. Mr. R. L. Stinton of Head Office Catering Section, introducing the new I.C.I. training film on emergency feeding, spoke of the progress made in training catering personnel in outdoor cooking techniques from the time the programme was first discussed in the summer of 1954 up to the present. The target was to have all the Company's kitchen units trained to an operational standard by the end of the year, and there were high hopes of this being accomplished.

Training of personnel in emergency feeding techniques may, in the event of atomic attack, make all the difference between survival or not. This was one of the points made by Mr. H. R. Duffield Harding, Emergency Feeding Officer for London and chairman of the Salon Culinaire at this year's Hotelympia Exhibition, when he spoke at the conference. "Lack of food is the greatest demoraliser of all," he said, and he urged an increasing awareness, especially in industry, of the enormous problems attached to emergency feeding. He then went on to talk about his own immediate concern, the emergency feeding organisation of the London area.

Emergency Feeding Film

The film was prefaced by a short introduction by the Chairman, Sir Alexander Fleck. In it he makes a plea for enrolment in the I.C.I. Civil Defence service, and goes on to stress the value of the training, especially practical training for emergency catering, not only in the event of future war, but also in the hazards of normal peacetime activities such as train disasters and floods. The film continues with demonstrations of the methods of building ovens and cooking for large numbers out of doors, and includes shots of a large-scale Civil Defence operation organised by Metals Division at Witton last autumn.

The second session of the conference was devoted to the subject of costing in the catering industry. Delegates heard a London Transport Executive accountant describe the elaborate costing system in operation in the L.T.E.'s canteens, and Mr. Duffield Harding talked of the costing involved in the mammoth task of feeding London's schoolchildren.

Mr. W. J. Willmoth, head of the Central Labour Department's Catering Section, spoke on the Company's catering service, and amused his audience by likening its growth since pre-war days to that of the oft-quoted Topsy. He went on to talk about the present high cost of running canteens, both at Head Office and in the Divisions, all of which were heavily subsidised by the Company. While it was unlikely, he considered, that the amount of the subsidy would be reduced, it was essential that this money should be efficiently spent. This he felt could only be ensured by detailed costing in every canteen in the Company, a theme emphasised by both Mr. R. L. Stinton and Mr. F. R. Noakes, who also gave papers on the subject. They were followed by Mr. A. C. R. Schild (Metals Division) and Mr. A. B. Galloway (Nobel Division), who described to delegates the costing systems in current use in their Divisions.

The conference concluded with a dinner at Imperial Chemical House. Guests at the dinner included Mr. E. T. Grint, Head of Central Labour Department, Mr. O. G. Goring, chairman of the Hotel and Catering Institute, and Mr. W. Bently-Capper, director of the Hotelympia Exhibition.

The Catering Conference dinner at Imperial Chemical House

WORKERS' PENSION FUND

At the meeting of the Central Council held in Blackpool last November a Metals Division resolution asking the Trustees of the Workers' Pension Fund to reopen the Fund in order to give a final opportunity to non-members to join was carried unanimously.

As most people will now know, from posters displayed in all works throughout the Company, the Fund was in fact reopened during the latter part of January and will remain open until 31st March. This gives non-members who are eligible until the end of this month in which to make up their minds whether or not to join. To be eligible for membership employees must be between the ages of 20 and 65.

Despite the fact that the Fund has been reopened on a number of occasions since the war and that since September 1952 membership of the Fund has been a condition of employment for new employees, there were still, at the end of 1955, about 5300 eligible employees who were not members of the Fund.

The I.C.I. Board and the Trustees of the Fund hope that there will be a good response to this further opportunity to non-members, for it is very much in the interests of employees that they should be in the Company's pension funds. A pension from the Fund is additional to and does not prejudice their right to any State retirement pension under the National Insurance Scheme.

Applications from employees interested in joining the Fund must be lodged at Labour Offices not later than *31st March* 1956.

MR. H. E. HOPTHROW

Mr. H. E. Hopthrow, C.B.E., an assistant secretary of I.C.I., has been appointed by the Minister of Transport as a member of the new committee of inquiry on Britain's inland waterways. Mr. Leslie Bowes, managing director of the Pacific Steam Navigation Company, is the committee's chairman.

The committee has been set up to report on the future of the country's system of inland waterways and to make proposals for any measures necessary for achieving the maximum economic use of these waterways.

ALKALI DIVISION

Bulk Shipment of Caustic Liquor

On 23rd January the 10,350-ton tanker *Athelstane*, one of the fleet of ships operated by the United Molasses Co., berthed alongside the tank wharf at Birkenhead to discharge a cargo of molasses from Cuba. Three days later she sailed again for Jamaica; this time with a cargo of caustic liquor, the largest bulk consignment ever made from Winnington.

Preparations for the bulk shipment of caustic liquor from Birkenhead extended over several months. First of all, one of the United Molasses Co.'s stock tanks at Birkenhead was taken over for storing the liquor. This was brought by road from Winnington Works, each road tanker carrying a load of 14 tons. In all, 670 loads were carried by the vehicles. Then the *Athelstane* had to be fitted with special valves, pumps and pipelines.

There was the human factor to consider too, and some of the ship's officers and crew visited Winnington Works to learn something of the peculiarities of 100° Twaddell caustic liquor and its handling.

For Alkali Division this "combined operation" means a saving of steel and fuel that would otherwise have to be used in packing solid caustic soda into steel drums; for the shipping line it means a return cargo where previously their vessels made the outward journey in ballast; and for the customer there is the reduction in price of the alkali due to bulk shipment. (*Pictures on page* 84.)

BILLINGHAM DIVISION

Battle of the Birds

A new onslaught on the Billingham starlings began last month. The birds, now estimated at well over a million strong, mostly fly in at dusk and perch on the pipe bridges at Ammonia Works. What brings the birds to Billingham? The warmth of the air above the pipe bridges and the smell of ammonia have been suggested as possible answers, but nobody really knows.

No one, however, will regret their going, for they make the night hideous with their piercing chatter and they constitute a very definite safety hazard. Their droppings foul the pipe bridge catwalks inches deep and make them dangerous for workmen.

All previous attempts to end the starling nuisance have failed. The bird has shown himself to be a cheeky and fearless foe. To frightening noise he answered with a mocking screech; of dead members of his kind strung up about his stronghold as a ghastly pointer to his fate he was unconcernedly contemptuous, and perched callously among them.

The law protects the birds, and they can be neither poisoned nor trapped with birdlime. Even shooting is forbidden unless, as in Billingham's case, it can be proved that they are causing damage to property.

For the latest attempt a gun team of experienced wildfowlers has been recruited from Ammonia Works. The

team operates at dusk as the flocks fly in to roost. The number of starlings actually killed will be very small, but it is hoped that the shooting will demoralise the masses and drive them to roost outside the factory area.

METALS DIVISION

I.C.I.'s Oldest Pensioner Dies

Mr. Tom Wood, "father" of the Company's pensioners, died recently. He would have been 98 on 18th May.

Mr. Wood, who started work with Elliott's Metal Company when he was 12, spent his entire working life with the Company, retiring in 1921. At one time he was in the unusual position of having two pensioner sons. Mr. W. T. Wood has in the meantime died, but Mr. Harry Wood still represents this grand old I.C.I. family in the ranks of the Company's pensioners.

Family's 186 Years' Service

Christmas Eve 1955 was certainly a date to remember in the household of Mr. and Mrs. S. H. Evans, who celebrated their golden wedding on that day.

Mr. and Mrs. S. H. Evans

The Company too has a special reason to be glad of that wedding fifty years ago, for Mr. Evans and his family have between them given I.C.I. no less than 186 years' service. Mr. Evans himself was employed at Landore Works for 49 years (35 as a foreman) before he retired nine years ago. Of his eleven children (two daughters and nine sons) four sons are employed by I.C.I. at Swansea and two other sons at one time worked elsewhere in the Company.

NOBEL DIVISION

Retirement of Export Sales Director

Over 46 years' service with the Company and its predecessors ended with the recent retirement of Mr. J. W. Donaldson, Division export sales director.

Mr. Donaldson, a Glaswegian, joined Nobel's Explosives Co. in 1909. In 1928 he was appointed manager of Explosives Industries Ltd., a post he held until the liquidation of that company in 1946. He became a delegate director of the Explosives Division in 1940, and in 1944 he was appointed export sales director. He was also a director of I.C.I. (Export) Ltd.

Most of his long service was applied to the selling of the Company's products, especially in markets overseas, and the success of the Division's post-war export drive owed much to his energy and knowledge of world market conditions.

Mr. J. R. W. Maxwell

Mr. J. R. W. Maxwell, a director of Nobel Division from 1940 until he retired in 1946, died on 26th January. He had been ill since the end of December.

Mr. Maxwell's career with the Company began in 1911, when he joined the staff of the Regent Factory, Linlithgow, as works engineer, later becoming assistant works manager there.

In 1920 he transferred to Nobel Industries Ltd., working first at headquarters and then at Ardeer, where he became works engineer in 1930.

He joined the Division board in April 1940 and during the difficult years of the last war was actively concerned in designing and supervising the building of the M.O.S. agency factories.

Mr. Maxwell is survived by a widow and two married daughters.

Royal Humane Society Award

Mr. J. M. Lindsay, who is employed in the Supply Department at Dumfries Factory, has been awarded the

Mr. J. Lindsay shows his award to his mother

parchment of the Royal Humane Society for saving the life of a 7-year-old girl.

The citation read that the award was made to him "for having, on 10th July 1955, gone to the rescue of a girl who was in imminent danger of drowning in the River Nith, Glencaple, and whose life he gallantly saved."

PAINTS DIVISION

Two New Division Directors

Mr. L. D. Stewart, Division Overseas Relations Manager, and Mr. J. G. Fisher, Division Home Sales Control Manager, have been appointed additional directors of Paints Division with effect from 2nd January. Mr. Stewart becomes Overseas Director and Mr. Fisher Home Sales Director.

Mr. L. D. Stewart

A graduate of Birmingham University, Mr. L. D. Stewart joined the Fredk. Crane Chemical Co. Ltd. at Bordesley Green in 1923, and when Crane's moved to their new factory at Smethwick in 1934 Mr. Stewart had been appointed Assistant General Manager. He was subsequently transferred to Nobel Chemical Finishes Ltd. in London and from 1936 to 1939 was head of the Commercial Sales Department in Nobel House. Mr. Stewart became Industrial Sales Manager in 1941, Home Sales Manager in 1946 and Overseas Relations Manager in 1955.

Mr. J. G. Fisher

Mr. J. G. Fisher, who was born in Australia, graduated at Cambridge in 1932. He joined the Service Department of Nobel Chemical Finishes Ltd., Slough, in that year. During the war he was much concerned with the provision and service of aircraft finishes, and in 1946 returned to Australia to a post in B.A.L.M. He came back to Britain in 1950 and after a year in the Bristol Area Sales Office became Midland Industrial Paints Sales Manager. He returned to Slough as Home Sales Control Manager early last year.

SALT DIVISION

Death of Runcorn's V.C.

Mr. Thomas Alfred Jones, V.C., D.C.M., a pensioner of Salt Division, died in hospital on 30th January. He was 75.

One of Cheshire's two V.C.s, his army career began in 1900, when he joined the Earl of Chester's Rifles. He won his Victoria Cross while serving as a private with the 1st Battalion, Cheshire Regiment, at Morval in France in 1916. Leaving his own lines to deal with an enemy sniper, he engaged and killed him in spite of receiving a bullet through his helmet and another through his coat. He next dealt with two more Germans who, although displaying a white flag, were sniping at him. Finally he reached an enemy trench and, single-handed, disarmed 102 Germans and marched them back to the British lines through heavy fire. Private Jones was decorated with his medal by King George V.

Two years later, in 1918, he was awarded the D.C.M. "for going five times with messages through intense barrage." On this occasion he also took charge of a number of stragglers and organised the capture of an enemy-held village.

Following demobilisation he returned to Weston Point Works (he had joined the Salt Union in 1913), where he worked as a fitter. He retired in 1949 after 36 years' service with the Company.

WILTON WORKS

Chairman at Foremen's Dinner

Sir Alexander Fleck, Chairman of I.C.I., attended the second Foremen's Dinner held recently at Wilton. Almost all Wilton's 140 foremen were present. At last year's function there were only about 100 foremen—an indication of the rapid growth of the works.

The chairman of the Wilton Council, Mr. C. M. Wright, welcomed the foremen and the guests. He said that this second Foremen's Dinner was specially noteworthy because Sir Alexander Fleck, who in his early years on the Board had been responsible for much of the development at Wilton, was able to attend.

Replying to the toast "The Company" (proposed by Mr. G. L. Oakes, a foreman at Polythene Works), Sir Alexander spoke of Wilton's development since the project was first discussed in 1943, and of the Board's confidence in the future of Wilton. He referred to the vast sums already spent on the project and the plans in progress for spending a further £25 million on development. Even this amount, he considered, was unlikely to see the end of construction on the site.

Sir Alexander Fleck replies to the toast "The Company"

Sir Alexander then went on to speak about the Company's trade prospects, stressing the importance of I.C.I.'s overseas business, and he told how he had recently visited undertakings in South America and on the Continent, where staffs were carrying on under difficult conditions.

The Deputy Chief Engineer, Mr. G. G. Lanham, proposed the toast to the foremen. He paid tribute to "these hard-working, loyal servants of the Company" and referred to the foreman's vital role in industry as a link between management and the payroll worker.

Cows and Chemicals

A nice touch of fancy is the naming of some of the Wilton Aberdeen Angus cattle after the well-known products of Wilton Works.

The following attested cows are registered in the Aberdeen Angus Herd Book: Butane of Wilton, Ethylene of

Polythene of Wilton

Wilton, Chlorine of Wilton, Naphthalene of Wilton, Olefine of Wilton, Phthalic of Wilton and Polythene of Wilton.

These cattle have been bred on Bank Top Farm on the south side of the Wilton Estate, where some 700 acres are being farmed directly under the Wilton Council. Nearly half this area has been reclaimed in the last five years, and the loss of agricultural land on the north side of the estate to industry has been offset by bringing this derelict land back into cultivation.

Two of the best heifers from Bank Top Farm were entered at the annual fat stock show at Guisborough market last Christmas, where they took the first and second prizes in their class. They were subsequently bought by the butcher who supplies meat to the canteens on the Wilton Site.

I.C.I. (SUDAN) LTD.

First Long Service Presentation

The first long service award in the history of I.C.I. (Sudan) Ltd. was recently made by the managing director, Mr. G. Lilleywhite, to Abbas Hamdan (a storekeeper) to

Mr. G. Lilleywhite makes the presentation to Abbas Hamdan

mark the completion of 15 years' service with the Company.

Mr. Lilleywhite, presenting Abbas Hamdan with an inscribed watch, commented on the happy coincidence of the presentation ceremony with the Sudan's assumption of independence, and he wished the country and its people a prosperous and successful future.

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OUR NEXT ISSUE

We lead in April with an account of I.C.I.'s plans for the manufacture of butadiene, with particular emphasis on the uses to which this synthetic rubber is likely to be put. Butadiene is expected to find its way into such diverse industries as paint manufacture and the boot and shoe trade. The article is being written by Dr. Maldwyn Jones, the manager of Plastics Division Technical Service and Development Department. He is the man who is behind the technical side of the new butadiene factory which is going up at Wilton and which is expected to be in production before the end of the year.

The colour feature is on the collection of what was once a very common commodity, namely cigarette cards. Mr. George Perkins of Head Office Pensions Department has a collection of over 100,000 cards, and a selection of these will be reproduced in colour.

We end with a piece of fiction. This is from the pen of Mr. John Watney, a recent recruit to Central Publicity Department and author of the best-seller *The Enemy Within*.

Majorcan Bullfight

By Joan Brown (Metals Division)

It was Nickolas, our Majorcan friend, who introduced us to our first bullfight in Palma. We were sitting in the Plaza de Gomila sipping cool iced drinks and debating what we should do with ourselves that evening when a very breathless Nickolas came tearing across the road, wildly waving some pieces of paper. He sank into the nearest chair, exhausted but beaming with satisfaction as he threw the tickets on the table.

So it was that we found ourselves part of the great throng surging towards the bullfighting arena. We boarded a ramshackle tram already so overcrowded that Murray and Nickolas had no option but to hang on like grim death to the window-frames outside. After a reckless and hair-raising journey we eventually arrived at the bullring, where we joined the long queue waiting patiently for the police to open the barriers.

Here we were pestered by street vendors with trays of sticky sugared almonds, nuts and dried fruits swarming with flies, their grimy hands outstretched and mournful brown eyes filled with crocodile tears as they begged us to buy their wares. We waved them away, but with little success; they dogged our footsteps right to the last minute, when we escaped with sighs of relief through the barrier into the vast arena.

I was immediately struck by its size. It was like a huge open-air theatre with low circular walls built in tiers, where one spent an uncomfortable two hours unless provided with a cushion, obtained for a miserable forty pesetas. Across the ring was the president's box, gaily decorated with coloured rosettes and banners, where he was sitting with his wife and some of the town officials. He held the place of honour at every fight, he alone having the power to stop the fighting, often according to the reaction of the very temperamental spectators. Two amateur bands playing on opposite sides of the ring strove valiantly to drown each other, their combined efforts producing a horrible ear-splitting clamour; and to add further to our interest we noticed a company of soldiers armed to the teeth lounging indolently along the back row of the arena.

A rustle of expectancy rippled through the crowd, and voices dropped to a subdued murmur as the bands came to a finale with one long roll of drums. Then a great cheer echoed throughout the bullring as the matadors, toreadors and finally picadors on horseback marched proudly into the arena.

What a splendid spectacle of colour and pageantry they made! Costumes of heavy satin sparkled and glittered with millions of tiny sequins as they caught the rays of the sun, royal colours vied with each other in their richness, and gleaming swords flashed blue fire to dazzle the eyes of the onlookers. The principal matador halted in front of the president's box and, bowing low, accepted the key which would release the first bull.

I sat tense between Murray and Nickolas, not knowing quite what to expect, when the bull, pricked with two small darts, roared into the ring. At first four toreadors played with him, passing cloaks in front of and behind their bodies, and as each made a successful pass the crowd yelled its appreciation with cries of *Olé!*

I soon realised that this part was merely a build-up to the dramatic climax, which was the kill. Another rousing cheer went up as two picadors with long barbed javelins galloped into the arena. The horses looked very old and pitifully thin, their sparse bodies covered with coarse padding which would afford little protection against the wicked horns of the bull.

We watched breathlessly as they closed in on each

side, but without further ado the bull lowered his head and charged, making straight for one of the horses. Cruel horns sank deep into its belly, and the horse was down on its forelegs whinnying in agony. Desperately the picador drove the javelin into the bull's neck, and as he failed to locate the right spot the crowd roared their disapproval, handkerchiefs waved madly towards the president's box, and Majorcans got to their feet yelling insults and blaspheming at the unfortunate man. After six or seven thrusts he managed to manœuvre his horse away from those terrible horns, and a pool of blood remained where the horse had fallen. As he left the arena, followed closely by the other picador, we could see blood still seeping through the padding.

The bull was nearly blinded with rage and pain by this time and stood with front legs apart, ready to charge. I felt thoroughly nauseated when I saw more blood spurting like a fountain from its wounds and coursing in crimson rivulets down the sleek black coat.

Next in the ring came a toreador carrying two sticks with barbed points. Nickolas explained that these had to be placed in a certain position behind the ears, so that the head could hardly move, thus compelling the bull to look straight in front of him. He stood waiting as though he knew that more pain was to be inflicted on him. We could hear the savage panting of the beast and see the heaving sides, now gory with blood. Saliva frothed and dripped from his mouth as he sent occasional roars to the watching crowd.

The atmosphere grew electric as the toreador stepped nearer. My fingers gripped Murray's shoulder, I could feel shivers of terror tremble down my spine. Turning, I saw Graeme white as a sheet, fear shining starkly in his eyes, while even the stalwart Nickolas, who had practically grown up with the bull fights, sat dumbfounded. We watched the distance lessen between man and beast. The bull backed away ready to rush at his enemy, but fleet as an arrow the toreador moved, aiming directly at the bull's neck. The sticks flew from his hands and he stepped quickly out of the way. But alas for the brave toreador, his mark had gone wide and the sticks hung dejectedly on each side of the bull's back.

The spectators went wild. Rising to their feet, they shook angry fists at the retreating figure. Shouts were directed at the president to stop the fight. Then the clapping started, a slow rhythmic monotone soon taken up on all sides, indicating that the people wanted their money back; but evidently the president after consulting his colleagues decided to ignore the demand, and the clapping quickly changed to a cheer as the matador entered the ring.

He doffed his cap with a flourish and waved his red cloak and sword at the bull. His majesty pawed the ground viciously, his back shining with perspiration, while the dark stream still oozed slowly from the deep wounds inflicted by the picador. His eyes were nearly blinded by blood clotted in the thick hair about them; but his fiery temper was undiminished, as snorting and tossing his head he waited, waited for the doom which he sensed was to come.

Boldly the matador walked towards him and stopped within a few yards. This was the climax, the moment everyone was waiting for, and we prayed that the matador might have better success than his predecessors. He placed his cloak carefully over the sword and stepping closer waved it in front of the bull, urging him to charge. The bull eyed it warily; then, infuriated by its movement, he charged.

Man and beast began their fierce game of death, played with infinite skill and patience on the part of the man, and primitive anger and terror on the part of the beast. With the lithe grace of a ballet dancer the matador aggravated the bull until at last he showed signs of tiring, and rushing at the cape he sagged exhausted to the ground.

Now at all costs the matador knew he could not kill while the bull was down, so again and again he tormented the creature with his cape until with a final heart-breaking effort the bull rose unsteadily on his legs. The matador opposed him, his face betraying none of the fear which he must surely have felt, his sword poised above his head in readiness for the kill. The bull stood with front legs apart—a dangerous position to the matador, as it enabled him to move more rapidly; so waving his cloak and coaxing the dying animal, he forced it to shift its stance until the forelegs were close together. One swift thrust and death should have been instantaneous; but Lady Luck had deserted the matador too, for his sword snapped—he had pierced too near the backbone.

. . . he forced it to shift its stance until the forelegs were close together

Fired with pain, the bull roared his agony to the crowd, now demented with fury at the lack of skill in the fighters. His sinewy body writhed as he charged blunderingly round the arena, leaving a fresh trail of blood in his wake. I sat terrified. Words stuck in my throat, while Nickolas got to his feet adding to the insults and curses thrown at the miserable matador, who with a gesture of failure spoke to the people, saying "Shall I kill the bull?" "No, no!" came back the universal cry. "Let the bull live—he does not deserve to die at the hand of a novice!"

Never had a matador suffered such an insult; his pride and honour lay in the dust at his feet, yet he still sought to appease the audience, knowing his popularity in the days to come as a fighter to be dependent on them. Running to the ringside, he took another sword from a waiting matador and once more approached the bull. The animal stood trembling and weak, making no effort now to stop the inevitable death for which he was doomed. The matador was within a foot of him, yet no movement did he make. His brave spirit was gone, and at the last fatal thrust the massive body quivered, sank to the ground and was still. Death had released him from his agony.

My taut nerves relaxed and I discovered that tears had coursed down my cheeks unnoticed. Graeme and Murray, too, had eyes suspiciously bright, but being men they kept their grief well hidden. Around us the spectators cheered that matador, who having successfully killed the bull now walked proudly round the bullring, acknowledging the cheers and collecting the ladies' fans showered at his feet. As he drew near I received my final shock: he was a young boy not more than sixteen or seventeen years old.

What a heartfelt relief it was when we emerged into the rambla again, feeling the warm sun caress our faces as somewhat subdued we made our way back to the pension. Was this to be the last bullfight for me? I doubted it; for, barbarous as it had been, there was a fascination which still lingered.

"Delphi"

B. R. Goodfellow (Head Office)